UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

APR 12 1996

MEMORANDUM

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

TO: Walter Walsh., OPPE

FROM: Jim Edward, FFEO

SUBJECT: DoD ENVVEST Submission

Attached is the Department of Defense ENVVEST/XL submission for Vandenberg Air Force Base in California. Because of early coordination between EPA and DoD on these proposals, we anticipate that the "triage" review for this pproject will not reveal deficiencies. When the triage review is completed, please forward the proposals to ICF for distribution under the XL project review process. As noted in the DoD transmittal letter from Mr. Peter Walsh, the schedule for implementation of the Vandenberg proposal will be significantly enhanced by an expedited review of the proposals. While we recognize the review must be thorough, we would request that reviewers of the proposals be alerted of the need for a rapid review.

DoD has requested that specific questions about the Vandenberg proposal be directed to DoD Headquarters. If you or any reviewers have any questions regarding the Vandenberg proposal, please contact Will Garvey of my staff, at 202-564-2458.

cc: Jon Kessler

AIR QUALITY ENVVEST INITIATIVE

ENVVEST PROPOSAL

The purpose of this proposal is to develop an emission reduction strategy for Vandenberg AFB which will result in significant actual emission reductions. Secondarily, ENVVEST provides the context or framework for which a "Non-Major" source determination can be made. Rendering Title V of the 1990 Clean Air Act Amendments (CAAA) as promulgated in 40 CFR Part 70 [hereinafter Part 70] inapplicable to Vandenberg AFB. The Vandenberg ENVVEST initiative will yield greater environmental benefits by improving air quality beyond those achieved through Federal, state, and local permit programs. Critical to execution of this initiative is the full endorsement of EPA (HQ & Region IX). Their advocacy with the Santa Barbara County Air Pollution Control District (SBCAPCD) will positively impact the administrative decision making process to redefine the "Major" source applicability determination criteria for certain sources. By redefining the applicability determination criteria, Vandenberg may establish an air emission inventory baseline which will legally support a "Non-Major" stationary source designation.[1] While the ultimate goal is to redirect Vandenberg's administrative expenditures from the Part 70 program towards achieving actual emissions reductions, a collateral result would be the inapplicability of requirements set forth under 42 USCA 7661-7661f.

Vandenberg AFB in cooperation with the SBCAPCD will develop air quality baselines from which to assess emission reduction opportunities. An assessment for each of the following emission source categories will be conducted: (1) new Title V permitable sources[2]; (2) exempt equipment/activities[3]; (3) sources permitted by local rule; and (4) Title II mobile sources. Applicable emission reduction goals and milestones will be developed to achieve reductions for selected source categories. While all pollutant categories will be targeted for reduction, the primary focus will be on nonattainment criteria pollutants. Examples of some proposals being considered for emission reductions are listed in Attachment 1 of this initiative.

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[1] It is important to note that whether or not regulatory discretion is permitted to redefine the "Major" source applicability determination criteria, Vandenberg AFB is not a "Major" source for hazardous air pollutants.

[2] Aggregation of emission sources across the 98,000 acres of Vandenberg AFB will capture an estimated 295 additional emission sources under the Part 70 program which were previously exempt from local permit.

[3] Exempt equipment/activities are those classified as insignificant and/or trivial pursuant to Part 70.

BACKGROUND

In California, the CAA is administered and enforced at the local level. The Santa Barbara County Air Pollution Control District was founded in 1971 to administer regulations for nonvehicular sources of air pollution. California state government often leads the nation in its regulatory agenda. When it comes to regulation of air pollution, California is the genesis for the Federal permitting program. The 1977 CAAA required permits for only "major stationary sources," i.e., those emitting over 100 tons of any criteria pollutant, California air districts have historically required permits for much smaller sources. In fact, *de minimus* thresholds in Santa Barbara County are presently set at 0.10 lb/hr for purposes of New Source Review and local permitting. A comprehensive federal permitting program wasn't enacted until the 1990 CAAA by Congress. The Santa Barbara County Federal permit program was granted "interim approval" by EPA on 1 Nov 95. However, SBCAPCD has had a local permit program in place since 1972. One major difference is the California program permits on an individual source-by-source basis versus a comprehensive operating permit for the entire stationary source.

Early on the California Air Resources Board (CARB) advocated equivalency for state and local permitting programs to obviate the Title V requirements. Unsuccessful in this effort, major sources in California are now faced with a dual permit program, i.e., Federal and state, thus doubling the administrative burden while generating little if any air quality benefit.

Vandenberg AFB is seeking to maximize use of limited resources for actual emission reductions that would otherwise be used up by administrative requirements of the Part 70 Federal operating permit program. Vandenberg believes ENVVEST offers the ideal framework to redirect Part 70 resources into emission reduction opportunities.

ENVVEST PROJECT CRITERIA:

I. ENVIRONMENTAL RESULTS

An emission reduction effort improving air quality is superior to a five year Federal operating permit merely maintaining it. Santa Barbara County is currently in attainment for all standards except the federal and state ozone measures, and the state standard for particulate matter less than 10 microns in diameter. In Santa Barbara County the primary ambient air quality problem is ozone. However, ozone is not produced directly by any pollution source. Instead, it is formed by a reaction between oxides of nitrogen (NO_x) and volatile organic compounds (VOC) in the presence of sunlight. Thus, reducing ozone is dependent on reducing its precursor emissions of VOC and NO_x. The major contributing anthropogenic pollution sources in the county are divided into two categories: stationary and mobile, therefore, both source categories must be addressed to seek attainment. Since the primary focus of Vandenberg will be on these nonattainment pollutants, this

ENVVEST initiative would contribute towards Santa Barbara County's achievement of state and national ambient air quality standards. Additionally, ENVVEST would team Vandenberg AFB with SBCAPCD to reduce ozone and thereby protect the public health and welfare of Santa Barbara County while meeting CAA goals.

II. COST SAVINGS & PAPERWORK REDUCTION

The estimated first year savings is approximately $573,400 with a potential cost avoidance of $772,500 annually in Part 70 administrative costs. The Vandenberg ENVVEST initiative will significantly reduce paperwork by comparison to Part 70, requiring only an abbreviated recordkeeping effort to track emission reductions from established baselines. To facilitate emissions tracking, the Vandenberg Air Quality Management Team has developed a base-specific air data management system to automate this effort.

1ST YEAR PART 70 OPERATING COSTS

CATEGORY	ELEMENTS	COST
Prepare Part 70 Permit Application	Air Quality Consultant	$300,000
Annual Administrative Cost	SBCAPCD Permit Program Staff	$160,000
Annual Enforcement & Inspections	SBCAPCD Inspection Staff	$100,000
Annual Part 70 Emission Fees	$110/ton of Criteria Pollutant	$13,400
	TOTAL =	$573,400

PERMIT PROGRAM COMPARISON

PERMIT PROGRAM ELEMENTS	SBCAPCD PERMIT PROGRAM	DUAL PERMITTING: SBCAPCD & PART 70 PERMIT PROGRAMS
# of Operating Permits	90 individual permits	90 individual permits + 1 facility wide operating permit
# of Sources Under Permit	approximately 230 sources	230 sources + approx. 295 new sources[4]
Major Permit Modifications	2-6 months in duration	6-12 months in duration
Inspection Cost	approximately $105,000/yr[5]	estimated cost $240,000[6]
Administrative Permit Costs: I. SBCAPCD Staff II. Contractor Support	 approximately 300,000/yr approximately 175,000/yr	 estimated cost $685,000[7] estimated cost $400,000[8]
Emission Fees	approximately $13,100/yr	estimated $40,600/yr[9]
Exempt Sources	multiple exemptions: based on categorical exclusions	virtually none: base-wide aggregation of potential emissions exceed most exemption thresholds[10]

Note: Part 70 operating costs prorated based on 1994 costs accounting for the number of additional sources expected to be governed by a Federal operating permit.

The bottom line; Part 70 will greatly expand the applicability, jurisdiction, complexity, and reporting requirements without necessarily improving air quality. However, ENVVEST could generate pollution prevention incentives which transcend traditionally non-regulated sources, i.e., exempt and mobile sources, yielding significant emission reductions in a cost effective manner.

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[4] Additional Part 70 sources are based on the SBCAPCD proposed insignificant activities list which imposes emission based "gatekeeper" thresholds of 2-5 tons per year per source category.
[5] Inspection costs are based on the SBCAPCD 1994 inspection fees.
[6] Additional inspection costs are estimated based on prorating the 1994 annual inspection cost of $105,000 for 230 sources to 295 additional sources under Part 70 requiring annual inspection.
[7] Additional SBCAPCD administrative costs are estimated based on prorating the 1994 annual administrative costs of 230 emission sources under permit to 295 additional sources under a Part 70 permit.
[8] Additional contractor support costs are estimated based on prorating the 1994 annual administrative costs of 230 emission sources under permit to 295 additional sources under a Part 70 permit.
[9] Emission fees were estimated based on the annual emissions generated from the 230 + 295 emission sources in 1994.
[10] 40 C.F.R. § 70.2. By definition potential is, "the maximum capacity of a stationary source to emit any air pollutant under its physical and operational design."

III. STAKEHOLDER SUPPORT

Base Officials: Since 1991, Vandenberg AFB for the purposes of New Source Review has been regulated as a "single stationary source." This leads to the aggregation of virtually all emitting units located within the facility.[11] Vandenberg was the first base nationwide to be regulated in this manner which has necessitated the increased sophistication of an award winning environmental program.[12] Creative problem solving and strategic environmental planning has been the key to effective air quality management. Due to early identification of 1990 CAAA issues impacting mission requirements has led Team Vandenberg to endorse this ENVVEST initiative. Part 70 implies that two to three times as many sources will be subject to permit versus the local permit program. Without the burden of a Federal operating permit governing virtually all activities on base; Vandenberg limited resources could be redirected to emission reduction initiatives. In addition to those administrative costs quantified above, permitting imposes numerous indirect expenditures, e.g., fuel sample and analyses, source testing and various forms of parametric monitoring. All of which are expensive measures necessary to demonstrate compliance with respective permit conditions.

Rather than literally hundreds of new sources governed by a Federal operating permit, ENVVEST would afford Vandenberg the opportunity to target these sources for emission reductions that would yield a greater air quality benefit. An example of targeted sources would be: power production; base infrastructure and maintenance operations; combustion sources; hypergolic propellant operations; and satellite payload processing. Without a Federal operating permit, this alleviates operational restrictions governing daily and annual hours of operation, emission limitations, extensive monitoring, recordkeeping and reporting requirements. Moreover, under the Part 70 program, if the base were to build, alter or replace any emission source; the erection or modification of these sources would impose an additional 6-12 month delay for the public review process. Part 70 severely inhibits the operational flexibility for rapidly changing mission-related space launch and ballistic missile operations without generating an air quality benefit.

Regulators: SBCAPCD is the local agency responsible for administrating requirements of the Part 70 Federal operating permit program. Vandenberg's Environmental Management Team has implemented several initiatives to build a strong relationship with the SBCAPCD and increase mutual trust. One strategy used to achieve the 30th Space Wing's goal of demonstrating environmental excellence has centered on enhancing credibility with regulators and the public. Therefore, Vandenberg AFB is well postured to obtain local approval of this initiative, if backed by EPA (HQ & Region IX).

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[11] The Vandenberg community may be viewed as a municipality with discrete clusters of "light" industrial activities separated by vast distances across 98,000 acres. This municipal nature of Vandenberg AFB consists of a variety of sources, e.g., residential housing areas, retail outlets, restaurants, gas stations, utilities, police and fire departments, hospital, recreational facilities, public schools, universities, day care facilities, chapels, and an airport.

[12] Vandenberg AFB was awarded the 1994 California Governor's Environmental and Economic Leadership Award, first time bestowed upon a Federal facility.

SBCAPCD as well as other air districts in California have expressed their discontent with the Part 70 Federal operating permit program, creating two permit programs to administer and no air quality benefit. SBCAPCD are proponents of pollution prevention through innovation as demonstrated by their Innovative Technology Group, recently awarded the 1996 Presidential Award for Sustainable Development. Vandenberg AFB has played an active role with the Innovative Technology Group cooperative partnership programs for several years. On 02 Feb 96, Vandenberg presented the concept of this ENVVEST initiative to SBCAPCD whom welcomed and supported the program.

Santa Barbara County: In July of 1994, a new 12-member Board of Directors (BOD) which serves as the legislative branch of the SBCAPCD was appointed. Members include the County Board of Supervisors and representatives from each county municipality; consisting of mayors and city councilmen. When the new BOD was appointed, Vandenberg's Environmental Management Team initiated an outreach program to enlighten several new board members on the complexities of Vandenberg's operations and how the mission is often impacted by air quality regulations. The success of these efforts was evident; in November of 1994 when the SBCAPCD BOD unanimously approved a revision to the SBCAPCD Clean Air Plan to add a "conformity" growth allowance into the State Implementation Plan of 75 tons per year (tpy) of VOC and 225 tpy of NOx for Vandenberg AFB construction emission related and reorganization projects, e.g., BRAC and commercial space ventures. The conformity growth allowance is for sources of pollution that are not required to have SBCAPCD or Federal operating permits, e.g., automobiles, aircraft, and construction equipment. The conformity growth allowance enables new large projects on Vandenberg AFB without delay while assuring the air quality in Santa Barbara County isn't compromised. Otherwise, large projects which could not show conformance would be disallowed. Vandenberg anticipates this type of community support to continue with an innovative program like ENVVEST.

Commercial Space: Through banking a percentage of qualified emission reductions generated by this proposal, would allow additional flexibility in bringing new commercial space ventures on base. Vandenberg would be able to boost the growth of clean hi-tech "national-level interest" industries while generating an economic benefit for California. Vandenberg AFB's intent to foster commercial space has been well received by the community. In fact, Vandenberg space launch operations boast the highest employment to pollution ratio in Santa Barbara County.

IV. INNOVATIVE/MULTI-MEDIA POLLUTION PREVENTION

Another strategy used to achieve the 30th Space Wing's goal of demonstrating environmental excellence has been to minimize environmental and regulatory impacts through innovation. Vandenberg AFB historically has served as the proving ground for clean air technology through cooperative partnerships with the SBCAPCD Innovative Technologies Group. These efforts are demonstrated by the conversion of three AF buses to hybrid power. The modified buses are powered by electric batteries which are

continuously recharged by an on-board compressed natural gas generator. Also, an advanced technology fuel cell was installed at the Launch Operations Control Center, replacing emergency diesel-fired generators providing pollution-free backup power. Efforts are underway to retrofit natural gas/propane-fired boilers with ultra low NOx burner technology. This proposal is merely an extension of an already existing commitment to pollution reduction. ENVVEST will serve as a vehicle for establishing a structured emission reduction program while developing mutually satisfactory means of assuring that this commitment is enforceable.

V. TRANSFERABILITY

Like several military installations, Vandenberg AFB is designated as a "single stationary source." A Part 70 "Major" source applicability determination requires aggregating actual/potential emissions across these large installations, which almost immediately triggers a "Major" source designation, thus subject to the Federal operating permit program. This proposal would enable sources on the brink of being in or out of the Part 70 program, an opportunity to redirect resources from permitting to an emission reduction program with the goal to achieve and maintain a "Non-Major" source status. ENVVEST offers the ideal framework for a "win-win" situation and all parties achieve their respective goals of emission reductions. Regulatory stakeholders benefit from the emission reductions achieved, while DoD installations retain necessary operational flexibility otherwise constrained by permit. The benefits of an installation maintaining a "Non-Major" source status are several: installation falls outside of the requirements of Part 70; exempt from Part 70 emission fees; nullifies Part 70-related future regulations, such as Enhanced Monitoring; will be covered by the existing state permit program, which is easier to revise as situations change; will not have to bear the burden of annual Part 70 reporting, recordkeeping, and compliance certification; and will only need an abbreviated emission inventory, limited only to the pollutant figured in the "Major" or "Non-Major" source status. Additionally, installations particularly in California would continue compliance with substantive CAA requirements, i.e., PSD, NSR, RACT, BACT, NEI, offsets, and prohibitory rules.

VI. FEASIBILITY

Normally, the baselining endeavor to assess emission reduction opportunities requires significant time and effort to complete. However, Vandenberg has already completed this task during preliminary Part 70 preparation. A comprehensive air emissions inventory was conducted, baselining 1994 activities. Additionally, the Vandenberg Air Quality Management Team has developed a base-specific air data management system. The goal of this effort was to provide rapid access to air emissions information to enable the base to be in timely compliance with current and known future requirements of both state and Federal air quality regulatory programs. This data base management system would serve as an ideal ENVVEST management tool to track emission trends and prepare emission reduction statements.

A continuation of Vandenberg's partnership with SBCAPCD's Innovative Technologies Group serves to facilitate making emission reduction initiatives technically feasible. The capital investment required for this proposal becomes palatable since a criteria for selecting emission reduction initiatives is multi-compliance oriented. In other words, ENVVEST would serve two purposes; enhancing compliance with other pollution prevention requirements while alleviating the onerous Part 70 administrative requirements.

VII. MONITORING, REPORTING & EVALUATION

Further enhancing the feasibility of this proposal is that the Vandenberg Environmental Management Team already has the tools in place to administer it, i.e., base-specific air database management system and articulate recordkeeping practices. With the inception of the SBCAPCD permit program in place since 1971, base tenants are conditioned to good recordkeeping practices. The Part 70 program further intensifies the recordkeeping requirements due to the aggregation of sources base-wide. Comparatively, the Vandenberg ENVVEST initiative would only require an abbreviated recordkeeping effort. Ultimately, the base stakeholders prefer documenting their level of emission activities through recordkeeping, rather than limiting permit conditions restricting those operations.

VIII. SHIFTING OF RISK BURDEN

Since the primary focus of the Vandenberg proposal targets nonattainment emission reductions; a collateral result is decreased ozone precursors. Ozone is a strong irritant that adversely affects the human respiratory system, potentially leading to lung damage. Asthma, bronchitis, and other respiratory ailments, as well as cardiovascular disease are aggravated by exposure to ozone. Also, ozone damages crops and wilderness areas and contributes to the degradation of materials such as plastics, paint, and textiles. Therefore, reducing the generation of ozone produces a direct corollary benefit; protection of public health and welfare.

IX. PUBLIC PARTICIPATION

A public notice introducing the proposal, goals and timelines of ENVVEST could be published to solicit comment. Updated notices of progress in meeting goals and timelines and response to comments could be posted. The existing Restoration Advisory Boards, Technical Review Committees, or other local advisory groups could be informed of ENVVEST. These committees or boards could be utilized as a forum to agenda ENVVEST as a part of their regular meetings. It is not advisable to generate a separate community review board specifically for ENVVEST.

X. ENVIRONMENTAL JUSTICE

Environmental Justice pursuant to Executive Order 12898 is not applicable to this proposal.

ATTACHMENT 1

The purpose of this attachment is to provide a cursory look at opportunities for creating emission reductions at Vandenberg AFB, and to identify the core criteria to be used in the prioritization of these opportunities. This preliminary assessment supports Vandenberg's proposed initiative for ENVVEST.

The following criteria apply to this assessment:

- Emission Source Categories - Those sources which contributed greatest to Vandenberg's emissions triggering Part 70 requirements will be targeted.

- Environmental Benefits - Where possible, focus on emission reductions which contribute to the achievement of NAAQS and CAAQS.

- Compliance Benefits - It is desirable to achieve two purposes with one action; namely, if enhanced compliance can be achieved while creating an emission reduction, e.g., Executive Order 12856 extremely hazardous and TRI chemicals, SB-14/1726 hazardous and extremely hazardous chemicals, ODC and EPA-17 chemicals, SB-1731 toxics, MACT standards, etc.

- Mission Impact - Emission reduction opportunities should not adversely impact base operations and the ability to accomplish the mission.

- Capital Investment/Cost Savings - Preference is accorded to emission reduction opportunities which are relatively easier and less expensive to implement, that is to say, those opportunities which afford a greater return on investment are preferred.

- Ease of Implementation - Complex changes requiring additional staff effort may not be accepted as easily as simpler ones.

- Growth Allowances - Preservation of the Vandenberg's ability to accommodate future growth is extremely desirable. Where possible a portion of the emission reductions shall be banked to account for future AF and commercial space operations.[1]

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[1]Strictly speaking, the Santa Barbara County Air Pollution Control District does not currently accommodate long term emission banking, this exercise will focus on opportunities which may ultimately result in emission reductions and banked credits, regardless of the District's precise posture.

Table 1 provides a list of emission reduction opportunities which merit further consideration, along with reduction estimates which might reasonably be expected, capital and operating cost investments, other benefits/liabilities, e.g., reduction of "hot spots", creation of new waste streams, and other pertinent information. For purposes of this review, 1994 actual emission estimates have been used as the 'baseline'. Rework of this baseline may be in order to take advantage of past clean fuel conversions and other emission reducing measures. Supporting information is organized according to source type; Table 1 includes emission reduction, capital investments, and benefits.

Portable Internal Combustion Engines

Conversion of these units to alternative fuels (i.e., methanol) has been considered and abandoned, and the measure of retrofitting with nonselective catalytic reduction (NSCR) is not typically practical for portable diesel-fuel fired units. However, it may be possible to retard the timing on some of these units (typically to 4 degrees before top dead center) and achieve NO_X reductions of up to 20 to 40% from baseline. For the purpose of this exercise, we assume that this will be possible for 50% of the units currently deployed, and that a 25% decrease in NO_X will result for each converted unit. We also assume that no additional equipment is necessary, but that the brake specific fuel consumption for the converted units may increase by 5%. Therefore, annual operating costs could increase by 5% for the units converted. All figures used are drawn from AP-42, Table 3.4-6.

Stationary Internal Combustion Engines

Replacement of some standby diesel-fired generators with uninterruptible power supply (UPS) systems is under consideration, however, future UPS installations on existing IC engines is undergoing further investigation. In addition to UPS replacement, a number of other emission control technologies are available, including turbocharging and aftercooling, and ignition timing retardation. Turbocharging and aftercooling may or may not be practical to retrofit to existing units, given the increased stress that such retrofits introduce to power train components. For the purpose of this exercise, we assume, as with portable internal combustion engines, its is possible achieve NO_X reductions of up to 20 to 40% from baseline, and that this will be possible for 50% of the units currently deployed, and that a 25% decrease in NO_X will result for each converted unit. We also assume that no additional equipment is necessary, but that the brake specific fuel consumption for the converted units may increase by 5%.

Boilers

Two options were considered for effecting emission reductions from boilers - low NO_X burner retrofits and wholesale replacement with electric boilers for units which have exceeded their useful life expectancy. It is understood that for boilers of the size range in question that postcombustion retrofits such as selective catalytic reduction are generally not cost effective nor technically practical, given the lack of the appropriate temperature window for optimum SCR operation in the exhaust train of the boiler. Furthermore, use of

SCR requires a new source of ammonia for use as a reactant, which is counter to ENVVEST objectives.

Cost information for burner retrofits and boiler replacement was provided by vendors, augmented by standard EPA cost estimation techniques for retrofit of emission control equipment. The size ranges of electric boilers which are commercially available closely mirrors the size ranges which make up the vast majority of units on Vandenberg AFB. Approximately 92 boilers at the base have a heat input capacity less than 0.3 MMBTU/HR, an additional 71 having a capacity less than 1 MMBTU/HR, and another 65 having a heat input capacity less than 5 MMBTU/HR. Vendor supplied costs are approximately $5,000, $20,000, and $70,000 for the equivalents of 0.3, 1.0, and 5.0 MMBTU/HR units, respectively.

Boilers account for nearly 40% of ozone precursor emissions from Part 70 sources on base. The cost to replace 25% of these units is very conservatively estimated at (23 * $5,000) + (18 * $20,000) + (16 * $70,000) = $1,595,000. The actual figures may be much less, assuming volume discounts. Annual operating costs are assumed to be similar to the existing gas fired units.

Low NO_x burner retrofit costs were similarly assumed at $11,800 and $17,850 for boilers having a capacity less than 1.0 and 5.0 MMBTU/HR, respectively. Therefore, the cost to retrofit 25% of these units is estimated at (41 * $11,800) + (16 * $17,850) = $769,400. Annual gas consumption may increase by 5 to 10%, since low-NO_x retrofits typically derate the capacity of the boiler.

Solvent Usage

For the purpose of this exercise, we assume that solvent use at Vandenberg AFB can be very roughly divided between applications where surface cleanliness and the precision of cleaning operations is very critical, as is the case with cleaning electronic or optical assemblies and payload fairing cleaning, and those applications where wipe cleaning is more general in nature, as with cleaning structure and vehicle surfaces.

An estimated 20% of the ROC emissions from solvent cleaning on Vandenberg AFB result from precision cleaning, and that in 50% of these cases, acetone or some other suitable replacement non-ROG aqueous cleaners can be substituted for the current material at no additional cost. In a number of cases, there may be some impact or cost associated with adapting operations governed by MILSPECs.

For the remaining 80% of ROC emissions from solvent cleaning, we also assume that a suitable substitute, e.g., 'Citri-Kleen', 'Citra Safe', 'Aero-Strip', 'D-Gel', etc., can be found for the current material in 50% of the cases, and that the cost of this material will be approximately equal to the material currently in use.

Abrasive Blasting

We assume that for abrasive blasting operations conducted outdoors in an uncontrolled manner, that all existing operations can be replaced by 'Vac-U-Blast' or equivalent units, which recover the majority of the expended abrasive. When the unit is used on an irregular surface, e.g., a piece with corners, some of the expended abrasive will not be recovered. We assume for this exercise that 80% of the material currently emitted will be controlled if conversion to these units is made. The labor time required to conduct a given cleaning operation will necessarily increase if Vac-U-Blasters are adopted, since the rate at which they can be used to clean a surface is necessarily slower.

Prices have been provided by equipment vendors, at approximately $10,000 for the largest sized unit, which has a capacity of 150 pounds of abrasive per hour. There are approximately 7 unconfined abrasive blasting operations on Vandenberg AFB. Assuming that the purchase of 10 Vac-U-Blasters of the capacity quoted above would fulfill the need, 80% of the PM_{10} currently generated could be eliminated for a price of approximately $100,000. It is understood that hydroblasting is not an attractive option, given the production of a wet waste material.

Storage Tanks

The emissions from storage tanks shown in the inventory are predominantly from gasoline tanks, which are already fitted with phase 1 and phase 2 vapor recovery systems. There are only four tanks in excess of 10,000 gallons which contain JP-8 and diesel fuel. Each of these tanks emits very little given the low volatility of these fuels. Therefore, it is assumed that there is little in the way of cost-effective control which could be implemented for these tanks.

Other Emission Source Categories

The following sources shall be assessed for emission reduction opportunities: Stationary Turbines, Architectural Coating / Surface Coating, Consolidate Painting Operations at IRF Paint Booth, and Fuel Vapor Incineration. Additionally, non-Part 70 sources such as Mobile Sources and Military Family Housing units are highly desirable areas to address for emission reduction opportunities. Typically, these sources generate the highest rate of return on investment and yield the greatest emission reductions. However, VAFB must be provided incentives in the form of emission reduction credits from these non-Part 70 sources which may be credited against the Part 70 baseline designating VAFB as a "Non-Major" source.

TABLE1: Preliminary Emission Reduction Opportunity Assessment

	Baseline Actual Emissions (tons/yr)							Capital Investment ($)	Annual Investment ($)			Expected Reductions (tons/yr)						Ancillary Benefits	Ancillary Liabilities
Source Category	NOx	CO	ROC	PM10	SO2	HAPS	Reduction Measure			Number of units	Date Effected	NOx	CO	ROC	PM10	SO2	HAPS		
All ICEs	26.9	20.4	1.06	1.05	2.83	0.25	Timing Retardation	0	+5%	100	Future	3.36	—	—	—	—	—	None	Derates engine approximately 5%, therefore causing greater fuel consumption
Stationary ICEs	—	—	—	—	—	—	Replacement w/UPS	TBD	TBD	3+	Future	TBD	TBD	TBD	TBD	TBD	—	Surrender APCD Permit Bank Emission Credits	May require new power transmission lines
Boilers (All)	32.7	7.93	2.16	3.37	0.56	0.12	Retrofit 25% w/ Low-NOx Burners	$769K	+5%	57	Future	3.28	—	—	—	—	—	Surrender APCD Permit Bank Emission Credits	Retrofit will derate boiler 5 -10%, causing greater fuel consumption
Boilers (All)	32.7	7.93	2.16	3.37	0.56	0.12	Replacement 25% w/electric	$1.6M	—	57	Future	6.55	1.59	0.43	0.68	0.11	0.03	Surrender APCD Permit Bank Emission Credits	May counter energy management initiatives, may require new power transmission lines
Stationary Turbines	0.1	—	—	0.6	—	0.89	Operational Restrictions	TBD	TBD	TBD	Future	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Surface Coating	—	—	2.15	—	—	—	Substitution / Emission Controls	TBD	TBD	TBD	Future	—	—	0.45	—	—	—	TBD	TBD
Solvent Usage	—	—	9.61	—	—	—	Substitution	0	0	—	Future	—	—	4.8	—	—	2.05	Surrender APCD Permit Bank Emission Credits	Possible MIDSPEC impacts, may require additional labor to achieve same effect
Fuel Vapor Incineration	TBD	TBD	TBD	TBD	TBD	TBD	Scrubbing	TBD	TBD	2	Future	0.54	—	—	—	—	—	Generate banked emission credits	Increased blowdown, incrementally greater treatment cost
Abrasive Blasting	—	—	—	0.58	—	—	Vac-u-Blasting	$100K	—	10	Future	—	—	—	0.58	—	—	Minimize lead particulate exposure to workers	Increases labor required to depaint a given surface
Consolidate Painting Operations at IRF Paint Booth	TBD	TBD	TBD	TBD	TBD	TBD	Carbon Adsorption System	0	$60K	1	1998	TBD	TBD	TBD	TBD	TBD	TBD	Generate banked emission credits	None
Mobile Sources	9.66	83.1	20.5	1.34	—	—	Fuel Conversion / TDM	TBD	TBD	TBD	Future	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

WATER QUALITY ENVVEST INITIATIVE

ENVVEST PROPOSAL

In Fiscal Year 1996, over 3 million gallons of industrial wastewater will be generated during launch processing operations at Vandenberg's primary Space Launch Complexes (SLC's) and Hypergolic Storage Facility (HSF). Although non-hazardous in a regulatory sense, these accumulated batch process wastewaters will typically contain concentrations of contaminants, resulting from inadvertent contact with other processing materials, which exceed local water quality discharge standards. On Vandenberg, these discharge to grade criteria exceedances have mandated the implementation of a logistically burdensome industrial treatment and management process, and have resulted in the inefficient use of local water resources. In an effort to provide overall greater environmental benefit at a reduced expense, Vandenberg is proposing to eliminate this current process by implementing a closed-loop industrial water reclamation initiative. This initiative, consistent with the ultimate goal of the Clean Water Act, will eliminate wastewater discharges by matching more closely on-site industrial water uses with water quality needs.

INITIATIVE GOALS

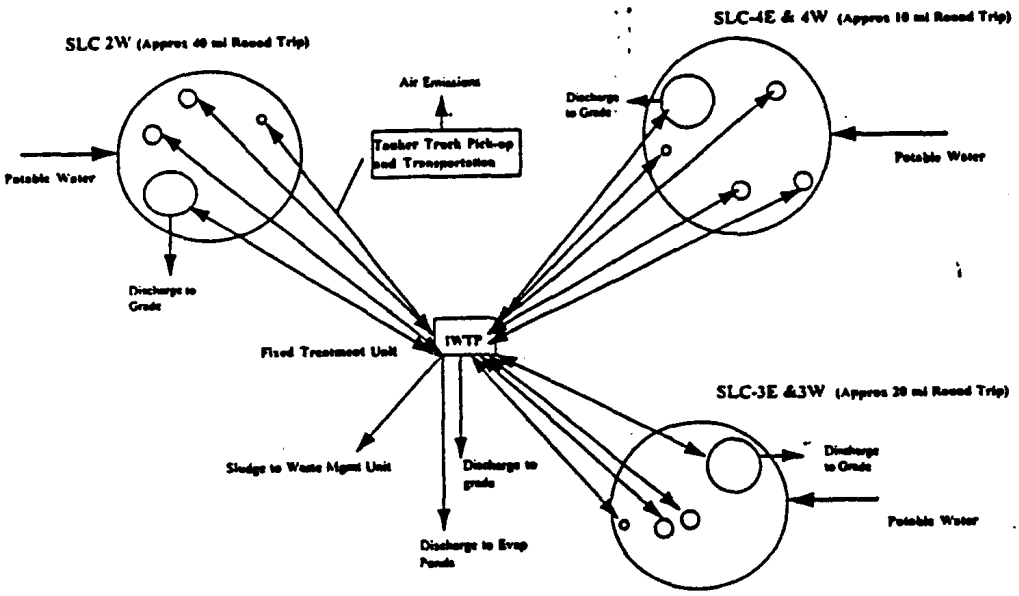
In all, the purpose of this initiative is to provide overall environmental benefit at a reduced cost. Consistent with this purpose, the goals of this initiative include:

- Eliminating current command and control discharge approval practice
- Establishment of policy guidance for closed-loop industrial reclamation
- Elimination of unnecessary transportation and treatment process
- Conservation of local groundwater resources
- Minimization of Multi-media impacts
- Minimization of environmental release and non-compliance liabilities
- Facilitating launch logistics and Base mission
- Encouraging application of innovative treatment technologies
- Minimization of compliance and operation and maintenance funding requirements

INDUSTRIAL WASTEWATER MANAGEMENT PROCESS

Vandenberg's current industrial wastewater management practice includes the use of one 'fixed' Industrial Water Treatment Plant (IWTP). Wastewaters generated during launch processing operations are initially accumulated, sampled, characterized, and then transported to the Vandenberg IWTP, a round trip in some instances of more than 40 miles. In all, wastewater contributions from the three primary SLC's and Hypergolic Storage Facility (HSF) represent nearly 90% of all industrial process water contributions to Vandenberg's IWTP. Figure 1 provides a graphical overview of the current wastewater process:

CURRENT SLC WASTEWATER MANAGEMENT PROCESS



(Fig. 1)

In addition to this active industrial process water use, an added 2 to 6 million gallons of potable water will be released to grade at these same facilities during related functional operational checks. These quantities are expected to rise dramatically within the next several years as new launch programs become operational and existing programs increase launch frequencies. Table 1 below identifies the three major SLC's on Vandenberg AFB and their wastewater characteristics associated with ***current*** operations:

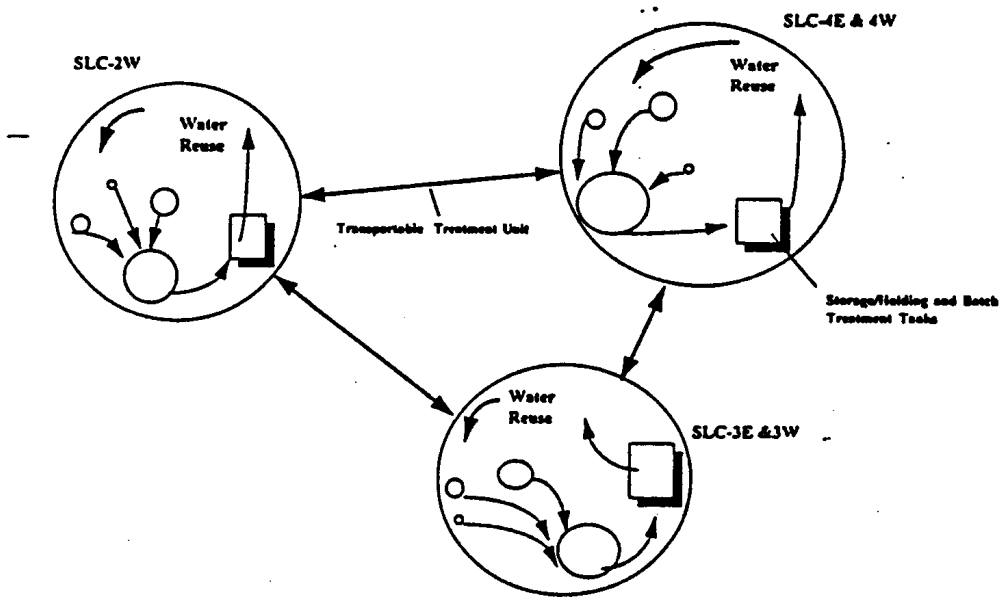
Location	Vehicle	Wastewater Processes	Contaminants	Ann Quantities	RT Dist to IWTP	Local Resources
SLC-2W	Delta II	Ignition Pulse Suppression Fire Suppression Pad Washdowns	Rocket Propellent 1 Solvents Hydrazines Metals	1.0-1.5MGals Industrial H2O 1.0-2.0M Gals Potable Process H2O Released to Grade	45 Mi.	Archeological Sites Endangered Species Installation Restoration Site
SLC-3E & 3W	Atlas	Overpressure Sound Suppression Deluge Water Fire Suppression System Pad Washdown	Rocket Propellent 1 Hydrazines Nitrogen Tetroxide Solvents Metals	1.0-1.5M Gals Industrial H2O 1.0-2.0 M Gals Potable Process H2O Released to Grade	16 Mi.	Wetlands Ephemeral Stream Archeological Sites Endangered Species Installation Restoration Site
SLC-4E & 4W	Titan II & IV	Overpressure Sound Suppression Deluge Water Fire Suppression Fuel/Oxidizer Transfers Pad Washdowns	Hydrazines Nitrogen Tetroxide Solvents Metals	1.0- 1.5 M Gals Industrial H2O 1.0-2.0 M Gals Potable Process H2O Released to Grade	10 Mi.	Wetlands Ephemeral Stream Archeological Sites Endangered Species Installation Restoration Site

Table 1

Implementation of the ENVVEST Water Quality initiative at Vandenberg AFB will facilitate a common sense approach to overall environmental risk reduction by reinventing the wastewater management process. Vandenberg proposes to enhance local environmental quality and reduce

environmental risks associated with industrial wastewater management by implementing a closed-loop water recycling process, augmented by a small scale on-site treatment process or a batch process transportable treatment unit, on each of the three major SLC's and at the HSF. This proposed concept is shown as Figure 2:

PROPOSED 'CLOSED-LOOP' RECYCLING PROCESS



(Fig 2)

This beneficial reuse or industrial water reclamation process would eliminate the need for wastewater discharges or inefficient off-site treatment by co-mingling or combining industrial (concentrations below hazardous waste criteria yet greater than release to grade criteria) wastewaters at each location. Process waters would then be recycled on-site and reused within an industrial setting. Process water treatment standards would subsequently be based upon the most limiting of occupational health or air emission criteria rather than more stringent release to grade or release to surface water criteria.

IMPACTS ASSOCIATED WITH CURRENT OPERATIONS

Water Use

In all, Vandenberg's current practice of using potable water in an industrial setting represents a poor use of finite, high quality water resources. As shown in Figure 3, Vandenberg AFB is currently completely dependent upon groundwater resources as a source of both industrial and potable water supply:

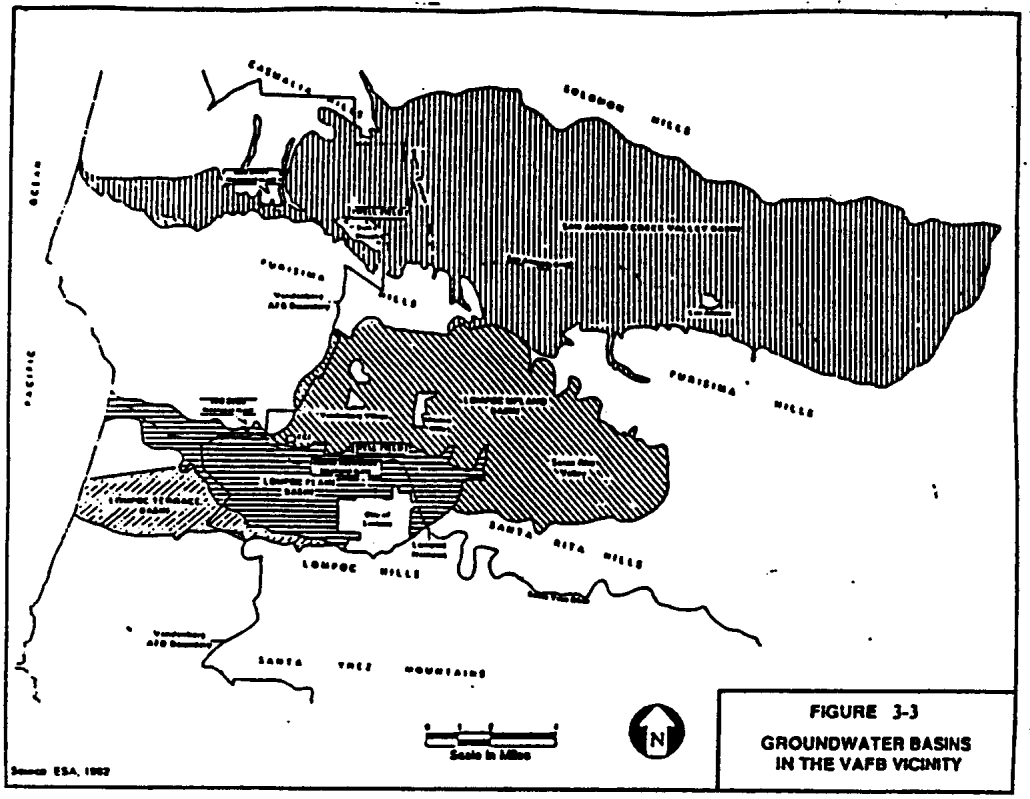


Fig. 3

As an example, the entire water supply for all of South VAFB, which includes SLC 3 and SLC 4, is supplied by 2 wells in the Lompoc Terrace Aquifer. These wells are currently pumped at an average rate of over 162 Million gallons each year. This pumping rate exceeds the annual average natural recharge by over 46 Million gallons per year. These sustained over-withdrawals, combined with below average rainfall totals in 7 of the last 9 years, have resulted in a 0.4 foot decrease in the Lompoc Terrace water table each year. SLC process water use at Vandenberg represents nearly 17% of this overdraft condition. Additionally, agricultural interests in the Lompoc Basin continue to struggle with salt water intrusion issues, a situation exacerbated by significant upgradient groundwater withdrawals.

Logistics

Vandenberg's current industrial wastewater management practice employs the use of diesel tractor trailers to support the movement of waters to the IWTP. Due to terrain considerations throughout Vandenberg, round trip maximum trailer water volume is limited to 2,500 gallons. These logistical constraints result in an annual requirement of 800 to 1000 tractor trailer round trips, in excess of 25 miles, in support of industrial water movements.

WHY ENVVEST ?

Successful implementation of this initiative is dependent upon the framework provided by the ENVVEST for several reasons including:

- Defining regulatory requirements with regard to industrial water reclamation
- Defining regulatory oversight responsibilities with regard to water reclamation
- Consideration, comparison, and weighing of all multi-media impacts
- Establishment of review/approval process
- Facilitating cooperative effort that benefits the environment

REGULATORY SUPPORT REQUIREMENTS

Successful implementation of this initiative would require regulatory agency support in several areas including:

- Clarifying scope of reclaimed water definition to include industrial wastewater
- Develop coordinated agency policy on water reclamation concept review and approval
- Establish contaminant thresholds/guidelines for industrial water re-use
- Waive and/or streamline treatment device certification requirements applicable to domestic wastewater
- Expand 'waste treatment in fully enclosed facilities' exemption
- Waive regulation of di minimis air emission contributions due to overall net decrease
- Establish streamlined monitoring and reporting procedures

ENVVEST COST MODEL

In support of the goal to reduce program costs while increasing net environmental benefit, several initiative summary cost models were developed.

Historical Cost Basis

As a historical basis, FY94 and FY95 total program costs were reviewed for incorporation of a baseline estimate. Provided below is a summary of FY94 expenditures and estimated costs which would be associated with implementation of the ENVVEST initiative. Cost model assumptions are also included:

A.	**COST ESTIMATES**	
1.	**Baseline Cost Estimate:**	
	IWTP O&M Expenditures:	
	- FY94 Plant Operating Costs (See Appendix 4)	331 K
	- Tractor Trailers Assemblies (2 Trucks/4 Trailers) Fuel/Servicing Provided through GSA (Estimated Annual Value)	150 K
	- Average Annual Facility Upgrade and Maintenance Expenditures (Estimated Annual Cost However 400K expended in FY96, See Appendix 4)	150 K
	- Annual Plant Sample and Analyses Costs (Release detection, water transfers, etc. See Appendix 4)	38 K
	IWTP Environmental Compliance Expenditures:	
	- Sample and Analyses Costs – Wastewater characterization including Bioenvironmental and Contactor Support (Estimated Costs)	110 K
	- Documentation Updates – IWTP Management Plan and Request Profile Sheet (Estimated Value)	5 K
	- Quarterly Discharge Report Preparation (Estimated Value)	8 K
	Amount of Water Treated at IWTP in FY94: 1.2 million Gallons	
	Total FY94 Estimated Expenditures:	792 K
	Unit cost per gallon of water:	$0.66/gal

(Fig 4)

2. **Initiative Cost Estimate:**

Capital Investment:	
- Design and Construction (Ref: RACER Cost Estimate, Appendix 4)	2,400 K
- Transportable Treatment Unit (Ref: SolarChem Rayox Design Test, Appendix 4)	195 K
Total Initial Investment Requirement:	2,600 K
Annual O&M:	
- Personnel and Management (Assume 2 FTE)	110 K
- Unit O&M (Estimated Cost, See Appendix 4)	91 K
- Distribution and Storage System O&M	20 K
- Sampling and Analyses (Assume maximum of 1 Sample Round per month per Site, Estimated Costs 20% of current batch process characterization)	25 K
- Unit Transportation (On-site treatment once every two months, Estimated Value)	70 K
Estimated Annual Costs:	316 K

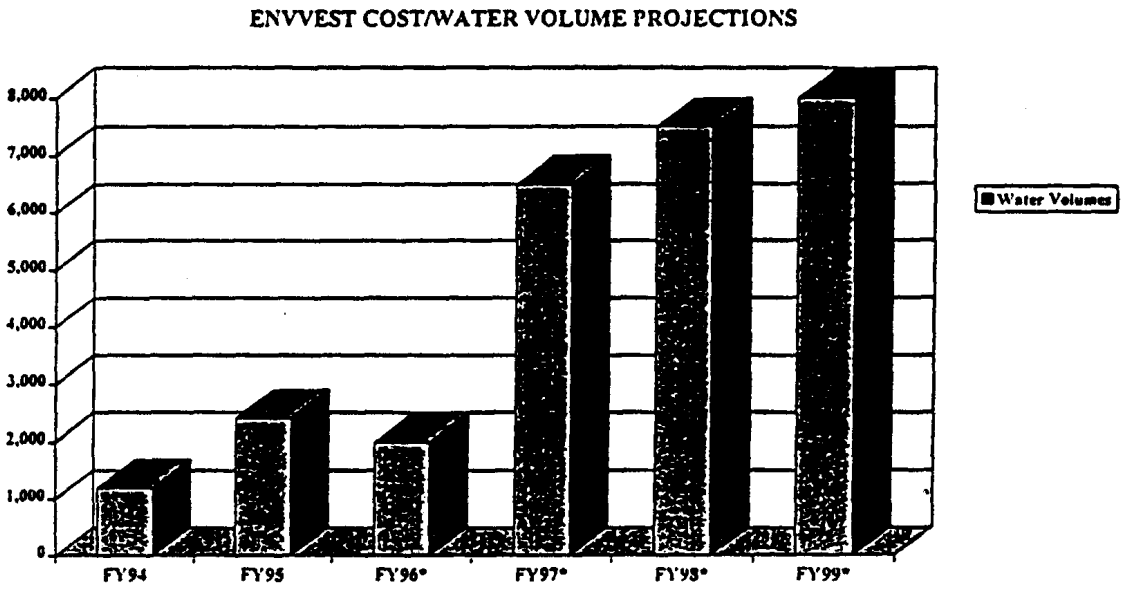
Estimated Available Annual Reinvestment due to Savings: (792 K - 316 K)	476 K

3. **Assumptions/Limiting Factors:**
- FY94 Expenditures and Wastewater Generation rates do not incorporate projected launch frequency increases(Delta II from 2 to 10 launches per year, Titan from 4 to 8 per year, Atlas pad under construction in FY94). In fact over 2.4 million gallons of wastewater were received at the IWTP in FY95 but cost figures were not obtainable
- Wastewater generation quantities are influenced by seasonal wet weather- FY 94 was a below average rainfall year
- Economy of Scale negated by current batch process sampling, characterization, movement, and treatment
- Mobile treatment process required for hydrazine concentration reduction, i.e., assume wastewaters not amenable to 'Low Tech' treatment
- Assume Skid mounted UV/O3 Treatment unit cannot be easily incorporated into mobile treatment process

(Fig 4 cont.)

Cost Projections/Comparisons

Provided below are figures that summarize and compare information derived and extrapolated from baseline estimates and projected launch increases on Vandenberg.



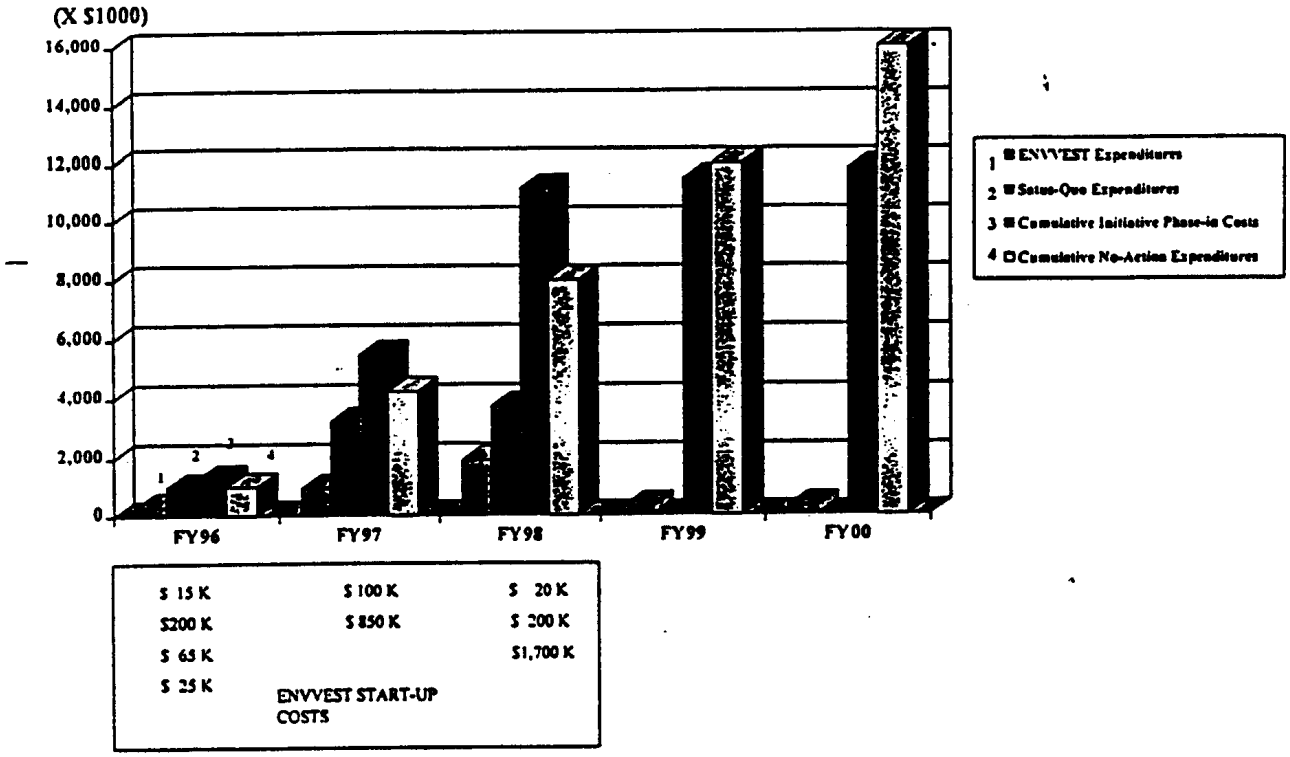
EXPENDITURES:	$792 K	$1,259 K	$1,000*	$3,250*	$3,750*	$4,000*
UNIT COST:	$0.66/Gal	$0.52/Gal	($0.50/Gal)*	($0.50/Gal)*	($0.50/Gal)*	($0.50/Gal)*

* Projected

MAJOR LAUNCH PROGRAM	FREQ	FREQ	FREQ	FREQ	FREQ	FREQ
SLC-2 (Delta II)	1	2	2	10	10	10
SLC-3 (Atlas)	1	2	0	2	4	4
SLC-4 (Titan II & IV)	2	2	2	4	4	4
Commercial Space (SSI)	0	0	0	4	12	24

(Fig 5)

ENVVEST WATER QUALITY INITIATIVE
CUMULATIVE ANNUAL COST COMPARISON



(Fig 6)

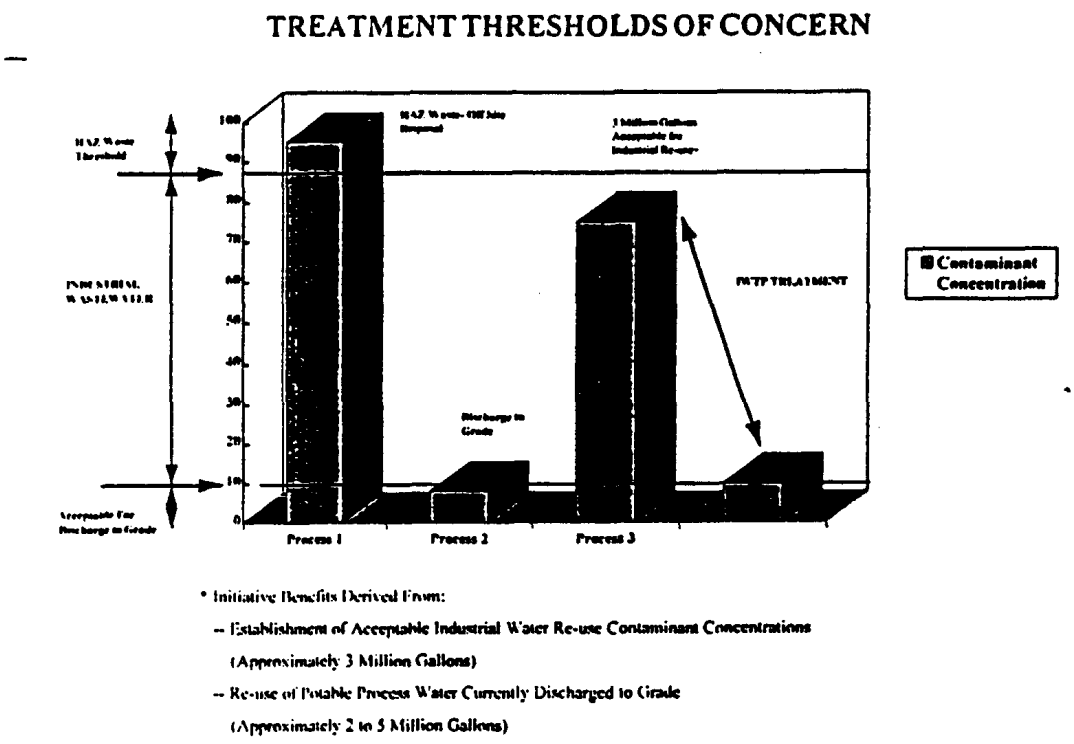
Source of Cost Savings

Long-term program cost savings are derived from several factors including:

- Elimination of transportation/logistical constraints
- Treatment efficiency requirement reduction- Reduce diminishing performance returns
- Reduced sampling and analyses expenditures (Bulked vs. Batch process Characterization)

- Streamlined reporting and oversight requirements

Figure 7 provides a conceptual overview of how some of these savings are achieved:

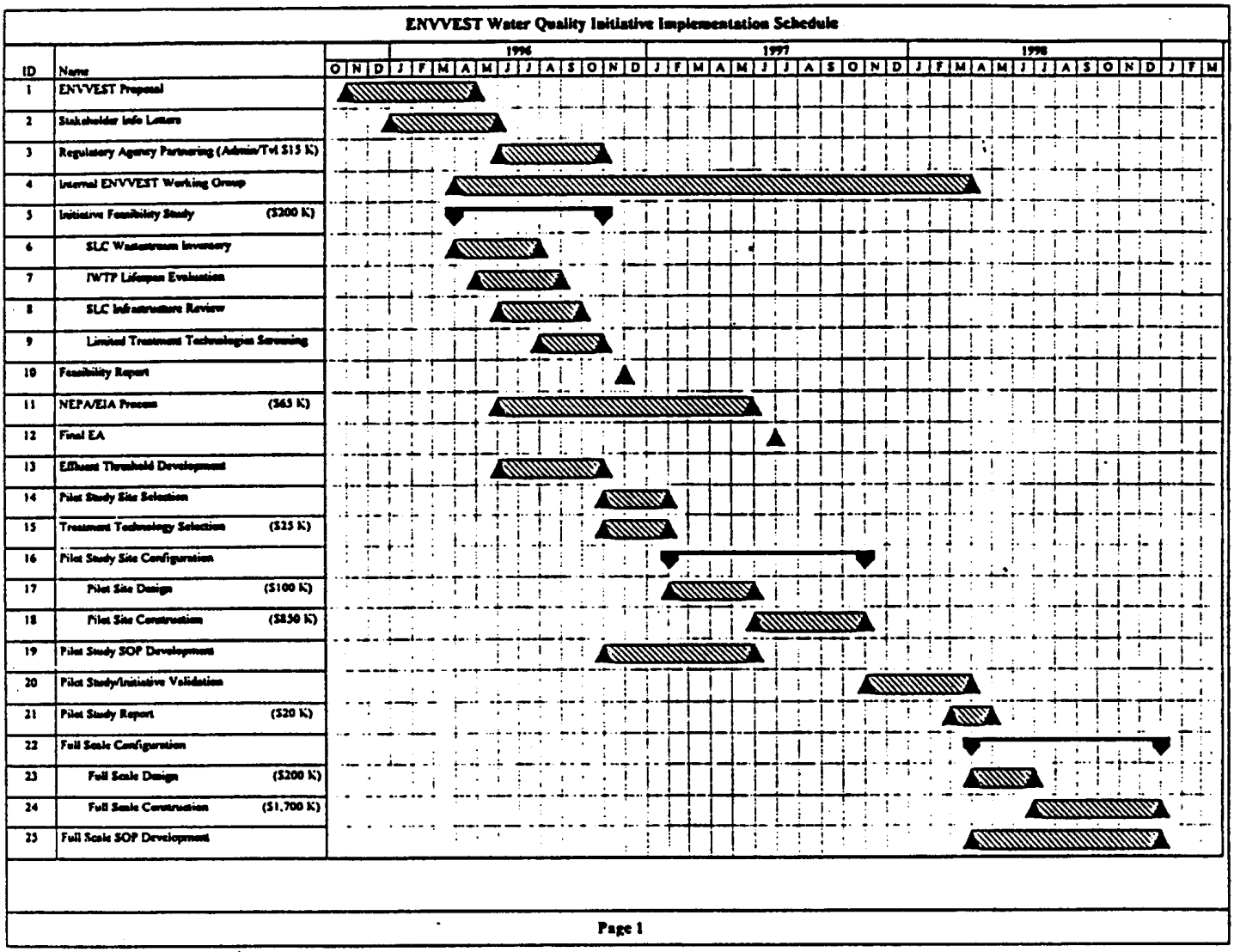


* Initiative Benefits Derived From:
  - Establishment of Acceptable Industrial Water Re-use Contaminant Concentrations (Approximately 3 Million Gallons)
  - Re-use of Potable Process Water Currently Discharged to Grade (Approximately 2 to 5 Million Gallons)

(Fig 7)

ENVVEST IMPLEMENTATION

Implementation of this initiative would proceed along the timeline provided as Figure 8:



(Fig 8)

ENVVEST PROJECT CRITERIA

Environmental Results

Implementation of this initiative would result in significantly enhanced environmental benefits exceeding the current waste management process including:

- Maximizing the use of finite potable water resources (now in overdraft conditions) through recycling and waste minimization
- Eliminating the current practice of batch characterization, transportation, and treatment

- Eliminating the need for large volume potable process water discharges to grade
- Eliminating the need for treatment to primary or secondary drinking water standards
- Minimizing 'waste' contact with the environment through closed-loop recycling
- Eliminating release and long term contamination liability associated with the current system
- Eliminating air emissions associated with tractor trailer water transport

Cost Savings and Paperwork Reduction

The Vandenberg ENVVEST initiative would result in substantial short and long term cost savings and paperwork reduction by:

- Streamlining regulatory inspection and reporting procedures through established self monitoring procedures
- Reducing sampling and analyses requirements (frequency, costs, turn-around time limitations) through process profiling and stockpiled wastewater monitoring versus continual and individual batch process monitoring
- Eliminating individual permit requirements and case-by-case waiver approvals for each discharge to grade
- Reducing treatment costs through the establishment of site specific industrial reuse standards
- Eliminating transportation and handling costs and liabilities
- Minimizing investment costs by utilizing as much of the existing utilities infrastructure as possible
- Reducing on-site launch processing delays created as a result of characterization time lag

Stakeholder Support

Through this initiative, Vandenberg would seek to achieve the support of a broad range of community and regulatory stakeholders including:

- The Central Coast Regional Water Quality Control Board regarding the reduced threat to local water quality, implementation of beneficial reuse options, and streamlined self monitoring and reporting
- California Department of Toxic Substance Control regarding participation in establishing constituent reuse concentrations
- Santa Barbara County Air Pollution Control District regarding di minimis evaporation or mechanical action losses
- SLC Users, including commercial space, regarding operational benefits
- Natural Resources Trustees regarding reduced impacts to threatened and endangered species, wetlands, etc.
- California Coastal Commission regarding water quality and land use issues pertaining to the coastal region
- Chumash Indian Tribes regarding reduced operational impacts on archeological resources,
- Local agricultural interests regarding groundwater aquifer overdraft conditions and saltwater intrusion